

The following extracts from the observations of Mr. William Curtis in the year 1800 refer chiefly to this species, or to *A. Malvæ*, on columbine :

“In very cold weather Aphides are oviparous, for this obvious reason: the eggs are capable of resisting cold more powerfully than the young. On the 22nd of November I found a considerable number of eggs which had been deposited in some auricula plants by a small green Aphis, which infests plants very generally, while the same *species*, on a geranium that I kept within doors, produced young. In mild winters I have observed in the month of January the same species of Aphis in great numbers on the same species of *Primula*, without doors, and all the females viviparous. These are facts that prove that all *Aphides* are not oviparous and viviparous at the same season, but that some may be wholly viviparous; that all such as are both oviparous and viviparous do not lay eggs towards the middle of autumn, nor at all during the winter, unless a certain degree of cold takes place.” “Seasons sometimes occur very irregularly indeed, on an average, perhaps, once in four or six years, in which they (the *Aphides*) are multiplied to such an extent that the usual means of diminution fail in preventing them from doing irreparable injury to certain crops. In severe winters we have no doubt but that *Aphides* are very considerably diminished; in very mild winters we know that they are very considerably increased; for they not only exist during such seasons, but continue to multiply.” “The common green Aphis, which is so generally destructive, lives during the winter season on such herbaceous plants as it remained on during the autumn, either in its egg or perfect state. If the weather be mild, it multiplies greatly on such herbage; as the spring advances, in May the males and females of these insects acquire wings: and thus the business of increase, hitherto confined, is widely and rapidly extended.”

[To be continued.]

PROCEEDINGS OF LEARNED SOCIETIES.

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March 27, 1849.—Wm. Yarrell, Esq., Vice-President, in the Chair.

MONOGRAPH OF THE LARGE AFRICAN SPECIES OF NOCTURNAL LEPIDOPTERA BELONGING OR ALLIED TO THE GENUS SATURNIA. BY J. O. WESTWOOD, F.L.S. ETC. (Continued from p. 306.)

Section C.

Sp. 13. SATURNIA EPIMETHEA. *S. alis anticis subfalcatis; subfuscis striga communi subapicali obscura extus pallide griseo*

marginata; *macula minuta mediana triangulari vitrea*; *posticis acute angulato-caudatis, ocello magno medio fulvo iride nigra annulo puniceo cinereoque cincta, margine antico alarum obscuriori.*

Expans. alar. antic. unc. 5-6.

Hab. in Guinea. In Mus. Britann.

Syn. *Phalæna Attacus Epimethea*, Drury, vol. ii. pl. 13. fig. 1; Fab. Ent. Syst. iii. a. p. 414; Gmel. Linn. Syst. Nat. 2404; Cramer, Ins. t. 176 A; Oliv. Enc. Méth. v. 29.

The antennæ of the male are rather small, with only 34 rays on each side, thirteen of the apical joints being destitute of rays. The palpi are small and distinct, rather dependent, but not extending beyond the hairs of the face.

Sp. 14. SATURNIA ALCINOE, Cramer. *S. alis anticis falcatis rufo-badiis*; *anticis costa lata alba, striga communi recta transversa prope basin, fascia lata alba pone medium in qua striga recta fusca*; *anticis macula mediana vitrea subquadrata, posticis ocello ovali pupilla vitrea, iride lata fulva, annulo nigro circumdata.*

Expans. alar. antic. circ. unc. 6.

Syn. *B. Alcinoe*, Cramer, pl. 322 A. *B. Caffraria*, Stoll, Suppl. Cram. pl. 31. fig. 2 & 2 e. *Saturnia Caffra*, Boisduval in Delegorgue, Voy. dans l'Afrique Austr. ii. p. 601.

Hab. in Caffraria, Amazoolu. In Mus. Britann.

The palpi are distinct and slender, but do not extend beyond the hairs of the clypeus. The antennæ of the males have 54 rays on each side, the two basal rays of each joint converging inwardly and being bent more obliquely, so that the tips of the rays form four distinct rows; all the rays are moreover set on more obliquely than in the typical species. The antennæ of the female are moderately pectinated, the two apical rays of each joint being almost obliterated. A beautiful figure of this species is given in Mr. Angas's plate of Zoolu Moths, fig. 15.

Sp. 15. SATURNIA ALINDA, Drury. *S. alis rufo-brunneis margine externo saturatori strigisque variis undulatis obscuris præsertim pone medium, macula semiovali mediana vitrea, posticis ocello magno pupilla vitrea iride fulva annulo nigro cincta.*

Expans. alar. antic. unc. $7\frac{3}{4}$.

Hab. Sierra Leone.

Syn. *Phalæna Attacus Alinda*, Drury, Illustr. iii. pl. 19; Oliv. Enc. Méth. v. p. 26. 10.

I have not seen a specimen of this species.

Sp. 16. SATURNIA PHÆDUSA, Drury. *S. alis anticis falcatis griseo-fuscis anticis strigis tribus transversis saturatoribus maculaque parva triangulari mediana vitrea*; *posticis obscurioribus ocello maximo pupilla minuta vitrea, iride lata nigra annulis concentricis anguste sanguinea, pallide punicea, et ferruginea circumcincta.*

Expans. alar. antic. unc. $7\frac{3}{4}$.

Hab. Sierra Leone. In Mus. Britann.

Syn. *Phalæna Attacus Phædusa*, Drury, Illustr. iii. pl. 24 & 25.

Bombyx Saturnus, Fab. Ent. Syst. iii. a. p. 409 ; Oliv. Enc. Méth. v. 27. 11.

The palpi are short and thin, but distinct. The antennæ are short, each joint emitting four rays lying flat.

The specimen in the British Museum collection is pale russet-coloured beneath with a pinkish bloom, the centre of each wing with a group of brown spots much larger in the hind- than in the fore-wings ; a small brown spot also occurs at the base of the hind-wings.

Sp. 17. SATURNIA TYRRHENA, Westw. *S. alis anticis falcatis griseo-fuscis basi rubidis, striga undulata prope basin alteraque lunulata subapicali fuscis, macula parva mediana subtrigona vitrea ; limbo apicali rufo ; alis posticis rufis ocello magno ovali nigra pupilla parva vitrea ; striga undata obscuriori, limbo lato pallide griseo-fusco.*

Expans. alar. antic. unc. 4-5¼.

Hab. Port Natal. In Mus. Britann.

The fore-wings are pale greyish-brown, sometimes with a reddish tinge ; they are acute at the tip in both sexes, but the outer margin is considerably more emarginate than in the female ; the base of the wing is red, and near the base is a red, very much angulated striga almost suffused into the ground colour of the wing, and outwardly edged with a slight dusky striga ; across the middle of the wing is a waved but nearly obsolete striga, and in the middle of the wing towards the fore-margin is a small subtriangular vitreous spot without any appearance of ocellus ; beyond the middle is a row of reddish arches inwardly slightly edged with a thin dusky line.

The hind-wings are reddish, with a broad pale greyish-brown border ; in the middle of the wing is a large round black spot, with a very small vitreous lunar spot in the middle, preceded and followed by a slight dusky waved striga. The body above is of the ground colour of the wings, with the hind part of the thorax marked with red. The underside of the body, collar, and spot at the base of the hind-wings are white. The head, antennæ and legs dark brown.

The wings beneath are very pale buff, with the centre of each marked by a large brown irregular spot, traversed by the pale veins.

Antennæ of the male with 32 rays on each side (four from each joint). One-third of the apical part of each antenna is destitute of rays.

The antennæ of the female are slightly pectinated for two-thirds of the base, the two apical rays of each joint being almost obsolete. The tips are serrated.

The palpi are deflexed, and the tips appear just beyond the hairs of the lower part of the face.

Var. Smaller, with the fore-wings and body destitute of the red colour, and the hind-wings fulvous with the outer margin purplish-grey, with the eye as in the others.

Sp. 18. SATURNIA FORDA, Westw. *S. pallide griseo-fusca* ♂, *pallide cervino-lutea* ♀, *striga subobsoleta pone medium, posticis*

etiam ocello parvo subvitreo, fusco, medio; alis posticis maris angulato-subcaudatis; fœminæ rotundatis.

Expans. alar. antic. unc. $4\frac{1}{2}$ – $4\frac{3}{4}$.

Hab. in Natalia. Mus. Brit.

Male with the fore-wings very slightly emarginate along the outer margin; hind-wings produced into a strong angle in the middle of the hind-margin; all on the upper side of a silky, pale brownish-grey, uniform colour, traversed by a slightly distinct, slender, brown striga beyond the middle. The hind-ones marked moreover in the middle with a small, round, dusky spot, having an indistinct vitreous lunule in the middle, and surrounded by an indistinct whitish circle. The antennæ are dark brown; those of the male are moderately bipectinated, each having about thirty-six rays on each side, a few of the apical joints being destitute of rays, and some of the preceding having the second ray gradually becoming obsolete. The female antennæ are only slightly serrated, the second spur on each side of each joint being obliterated. The veins are those of the typical *Saturnia*.

The female has the body and wings of a pale reddish buff, with the dusky striga beyond the middle almost obliterated, and the dusky spot in the middle semicircular. On the underside the hind-wings have also a small oval dark spot towards the base.

Sp. 19. SATURNIA ANGASANA, Westw. *S. alis anticis apice acutis isabellinis, fascia pallide grisea ante medium, strigaque tenui oblique fusca pone medium maculaque parva semi-ovali vitrea mediana; posticis ocello magno nigro, pupilla minuta vitrea, annulis concentricis testaceo, puniceo-albo, et sanguineo cincta.*

Expans. alar. antic. unc. $5\frac{3}{4}$.

Hab. apud Portum Natalensem. In Mus. Britann.

Isabelle-coloured or pale rufous brown, with an irregular pale greyish bar before the middle, followed by an oblique darker fascia, on the outside of which is a small semi-oval talc-like spot; beyond this, extending from near the tip of the wings towards the middle of the inner margin, is a nearly straight, slender, darker line, edged with greyish on each side; the apical margin of the wing beyond the dark line becoming grey, shaded off to the ground colour of the wing. The hind-wings have a large ocellus, black in the centre, with a minute vitreous dot in the middle, with a red lead-coloured ring outside the black, followed by a fleshy-coloured one, and this by a purple-carmine one: the outside of the ocellus rests upon a dark, slender, curved line. The collar and underside of the body whitish; head and legs darker olive-brown; antennæ black.

Wings beneath pale reddish buff, of a redder brown near the tip, with the dusky subapical line as above, and the vitreous spot preceded and followed by a dark claret-brown spot: hind-wings destitute of the ocellus, which is replaced by an indistinct claret-brown spot, followed by a red-brown fascia, widest at the anal margin. Near the base is also a small brown spot.

The antennæ of the female are serrated, the two terminal rays of each joint nearly obliterated, with one-fourth at the apex simple.

This species is figured by Mr. Angas in his plate of Amazoolu Lepidoptera, fig. 16.

Sp. 20. SATURNIA ACETES, Westw. *S. alis anticis apice acutis obscure fulvis striga valde undulata cinerea prope basin ocello mediocri mediano fusco et vitreo strigaeque recta fusca subapicali, posticis magis ferrugineis ocello magno medio pupilla vitrea, iride nigra annulo albo cincta strigaeque tenui transversa fusca recta prope medium* (♀).

Expans. alar. antic. unc. $6\frac{1}{2}$.

Hab. apud Caput Palmarum (D. Savage). In mus. nostr.

The fore-wings are of a dark reddish fulvous colour, tinged with red-brown between the middle and the apex. Near the base is a very irregular, rather indistinct, ashy-purplish striga, and in the middle of the wing is an oval moderate-sized ocellus, the basal half being brown, and the apical half vitreous, the latter surrounded by a slender brown line; halfway between this ocellus and the apical margin of the wing is a straight, slender, brown line, running from near the apex of the wing towards the middle of the inner margin. The hind-wings are of a much redder hue, especially on the anterior portion, with a slight appearance of the sub-basal ashy striga of the fore-wings near the base; the middle of the wing occupied by a large ocellus, with a vitreous centre, having a rather broad greyish-black iris surrounded by a white ring, the outer extremity of which rests on a slender dusky striga running from near the outer angle of the wing towards the middle of the anal margin. The body is rich brownish fulvous, with an ashy-brown collar and legs. The antennæ black and very slightly pectinated in the female, consisting of about thirty-five joints, the first twenty-five emitting a pair of short slender branches from the base, the tip of the joints being also slightly serrated; the ten terminal joints are shorter, each emitting a single branch set on in front of each joint, the branches of the preceding joints being set on the upper and lower edges.

The wings beneath are paler buff-brown, with a broad, subapical, dusky bar, undulated externally; the eye of the fore-wings less distinct, and that of the hind-wings replaced by two brown spots and a vitreous patch. Near the base of the wings is also a round brown dot.

Sp. 21. SATURNIA ISIS, Westw. *S. alis griseis nigro fuscoque irroratis, striga fusca valde dentata ante medium alterisque duabus nigris pone medium, ocello parvo vitreo antice nigro; posticis ocello maximo ornatis, pupilla nigra postice subvitrea, iride obscure fulva annulisque concentricis nigro, subluteo, pallide carneo, purpureo-rufescenti, iterumque carneo et pone hanc striga curvata nigra, apice obscure albido limbo griseo.*

Expans. alar. antic. unc. $5\frac{3}{4}$.

Syn. *Saturnia Isis*, Westwood in Jard. Nat. Library, Entomol. vol. vii. p. 138. pl. 13. *S. Maia*, Klug, Neue Schmett. t. 5. fig. 1 (nec *Ph. Maja*, Drury, Ill. vii. pl. 24. fig. 3).

Wings of a very pale grey colour, especially the anterior pair, which are almost entirely covered with fine black and brown scales.

The centre of these wings is ornamented with a small oval ocellus, the basal half of which is covered with black scales, and the outer half is vitreous: between this and the base is a very curved and irregularly dentate dark striga, and immediately behind the eye is a nearly straight, slender, brown bar. This is succeeded by slender black wavy bars, the space between which and the apex of this wing is divided as it were into three compartments, the first of which is covered with small brown scales; the second is paler, and covered with very fine black speckles, and the apical part is much darker, with large black speckles; the apical margin of the fore-wings is slightly waved. The hind-wings are entirely covered on the upper side by a most magnificent eye-like spot, surrounded by successive rings of various colours. The oval pupil is black, but the part furthest removed from the body is denuded of scales, and would be vitreous were not the underside of the wings clothed with scales: this is surrounded by a narrow fulvous iris; then black; then a broader oval ring of dirty clay colour; then a narrow oval of pale flesh-colour; then a broad, rich, claret, oval ring: between this and the base of the wing is first a bar of flesh-colour, then black, shaded into claret; towards the extremity of the wing the claret is succeeded by a half-ring of flesh-colour; then a narrow one of black; then of pale buff stone-colour, and another moderately broad of grey speckled with black, extending to the extremity of the wings. The thorax is dark and rich brown coloured, with two white bands across the neck and two across the extremity of the thorax whitish; the abdomen is buff, with black dots. The margin of the wings is scalloped.

Beneath, all the wings are very pale buffish white with dark speckles; the fore-wings are marked nearly as on the upper side, but the hind-wings have only a very small eye in the centre, having a black pupil with a fulvous orbit surrounded by a slender black circle; immediately connected with the posterior part of this eye is a curved row of brown arches, between which and the apex of the wings is another and more slightly marked series of black scallops. The palpi are distinct, forming a small brown muzzle, but they are not visible from above; they, as well as the rest of the head, are brown. The spiral tongue appears to be wanting. The antennæ of the male are considerably elongated, with the rays bent backwards instead of lying flat, and there are eighty-eight rays on each side of the antennæ, the rays extending to the tip, so that the antennæ are composed of about forty-four or forty-six joints. The antennæ of the female are setaceous, and only slightly bipectinated, being gradually more slender from about one-third of the distance from the base to the apex, each joint emitting four rays, the joint at each point of emission being swollen.

The female has the wings rather shorter, and not at all emarginate along the apical margin.

Sp. 22. SATURNIA NICTITANS, Fabr. *S. alis margine apicali integro, fusco incarnatis medio obscuriore, striga tenuissima angulata prope basin alteraque recta subapicali fuscis punctoque parvo medio vitreo; posticis concoloribus ocello magno*

medio pupilla parva vitrea, iride flava, annulis nigro, puniceo et albo cincta, strigaeque transversa nigra subapicali.

Expans. alar. antic. fere unc. 5.

Hab. in Africa tropicali. In Mus. Banks. (Soc. Linn. Lond.), Mus. Britann. et nostro.

Syn. *Bombyx nictitans*, Fab. Ent. Syst. iii. a. 413.

The antennæ of the male are 39-jointed, with fifty-eight rays on each side (four from each of the twenty-nine or thirty basal joints), the rays lying nearly flat.

The antennæ of the female are about 42-jointed, only slightly serrated, each joint having two serratures on each side, the basal one being most prominent, the antennæ becoming gradually more slender to the tips. The palpi are short, but distinct and deflexed.

Sp. 23. SATURNIA ALOPIA, Westw. *S. alis anticis fusco-albidis, striga recta puniceo-alba ante medium maculaque parva triangulari mediana vitrea, strigaeque postica recta fusca externe puniceo-tincta, posticis etiam bistrigatis ocelloque parvo vitreo, iride obscure lutea circulo nigro alteroque late puniceo-albo circumdata.*

Expans. alar. antic. unc. $4\frac{1}{4}$.

Hab. —? In Mus. Britann.

Fore-wings brownish buff, with a pale pinkish white, nearly straight fascia across the wings before the middle, edged towards the base with a fine dark line, the other side shaded off to the ground colour of the wings; beyond the middle is a small triangular vitreous spot, bounded at the base by the transverse veinlet closing the discoidal cell; beyond the middle is a straight, slender, dark striga, edged with pale pinkish white; the outer margin of these wings slightly emarginate; hind-wings entire, somewhat oval, brownish buff, the middle with a pale rosy tint, bearing an ill-defined whitish fascia towards the base, and another, followed by a dusky line, beyond the middle; the middle of the wing occupied by an ocellus, with a small glassy centre, surrounded by dirty buff, and this by a black circle and a larger, pale pinkish white one; thorax in front with a white transverse fascia; antennæ dark brown.

The antennæ of the male are small, moderately short, the rays flat, thirty-four rays on each side, one-fourth of the antennæ at the tip being destitute of rays.

The palpi are distinct, but small.

Sp. 24. SATURNIA ETHRA, Westw. *S. alis omnibus apice undulatis, anticis subfalcatis, posticis in medio in caudam truncatam productis; fusco-albidis fusco irroratis, anticis dimidio basali pallidiore, strigis tribus fuscis undulatis 2da magis distincta mediana et cum ocello parvo medio conjuncta; posticis ocello maximo; pupilla lunata vitrea iride nigra circulo tenui luteo, 2do nigro, 3tio latiore luteo-fulvo, 4to albo; striga basali angulata alterisque duabus pone medium undulatis nigris; parte antica alarum puniceo-rufa.*

Expans. alar. antic. unc. $5\frac{3}{4}$.

Hab. —? In Mus. D. Loddiges.

Ann. & Mag. N. Hist. Ser. 2. Vol. v.

The fore-wings of this fine species are rather narrow and subfalcate, with the apical margin rather waved; they are of a buff-brown, very much irrorated with darker scales, the basal half of the wing and costa being much paler; they are traversed by three very oblique brown strigæ, of which the middle one is the thickest; the anterior one is very much waved and dentated, the second much-waved, having attached to it near the middle of the wing a small oval ocellus, of which the anterior half is brown and the other half vitreous: the third fascia arises on the costa from a larger brown spot. The hind-wings are similarly coloured to the apical portion of the fore-ones, except that the anterior portion is of a rich pinkish red which extends half round the ocellus, which is large and central, having a small semicircular vitreous pupil surrounded by a black iris round which is a very slender luteous ring, and another black, followed by a pinkish-buff broader ring, and this by a white one. Across the base of the wing is a brown angulated striga, being the continuation of the central one of the fore-wings, and from the inner margin of the ocellus runs a waved one to the anal margin, followed by another running across the wing parallel to the apical margin. The apical part of the wing is much freckled with brown, and a thin brown line runs just within the margin. The thorax is dark brown, with a pale buff collar; the hind-part pale, with a short black bar. Wings beneath coloured as above, except that the fore-ones are tinged on the inner margin with pink, which colour is entirely wanting in the hind-wings, which are more freckled with brown than above, the ocellus being replaced by a small brown spot.

The pectinations of the antennæ of the only specimen I have seen (which is probably a female) are comparatively short, each antenna having thirty-eight rays on each side (four from each joint), and about one-fourth of the antennæ at the apex is destitute of rays. The palpi are very small, but distinct.

This fine insect is unique in the collection of Conrad Loddiges, Esq., of Hackney, who is not aware of its locality; but from its relationship to *S. Isis*, I have but little doubt of its being a native of Africa.

Section D.

Sp. 25. SATURNIA LUCINA, Drury. *S. alis anticis falcatis, posticis rotundatis, omnibus albido-griseis fusco multum rivulosis strigis undulatis submarginalibus, anticis maculis nonnullis mediis ocelloque parvo apicali nigris.*

Expans. alar. antic. unc. $6\frac{3}{4}$.

Hab. Sierra Leone.

Syn. *Phalæna Attacus Lucina*, Drury, Illustr. iii. pl. 34. fig. 1; Oliv. Enc. Méth. v. 31.

I have not seen any specimen of this insect, the veins of which agree rather with *Saturnia* than *Lasiocampa*, although the antennæ seem but narrowly pectinated.

Sp. 26. SATURNIA NENIA, Westw. *S. alis anticis apice rotundatis; plumbeo-nigris apicibus magis fuscis luteoque irroratis striga tenui irregulari nigra obliqua, ante medium alteraque*

minus distincta at magis obliqua, et ad costam valde angulata, macula media irregulari albida; posticis nigricanti-fuscis basi puniceis macula magna media pallide flava.

Expans. alar. antic. unc. $4\frac{1}{4}$.

Hab. apud Caput Palmarum (D. Savage). In mus. nostro.

This curious species has the fore-wings broad, with the fore-margin rather suddenly angulated beyond the middle, and with the apical margin rounded, the extreme tip forming a small, rounded, slightly detached lobe. The general colour of the wing is a dark leaden-coloured blackish-brown, slightly irrorated with fulvous scales, especially towards the tip of the wing, which is rather paler and more varied than the rest. At about one-third from the base runs an oblique, black, irregular striga, which is followed by another more slender and indistinct, and more slanting, being suddenly strongly angulated near the costa, where it terminates in a strong black dash. Between the strigæ is an ill-defined fulvous-buff patch in the middle of the wing. The hind-wings are blackish brown, with the base pink, and with a large, very pale yellow patch in the middle. The body is blackish brown and slightly irrorated. The abdomen is much swollen in the only specimen I have seen. Beneath, the wings are very much freckled with grey, black, buff and white, especially beyond the middle; the fore-wings have a large patch of rose-pink along the inside at the base, followed at some distance by a rather broad, very pale yellow bar; the hind-wings want the pink colour, but have the pale yellow patch as on the upper side.

The antennæ of the female consist of twenty-two joints, emitting only a pair of rays from the base of each, the apical pair being indicated by a very slight serration, followed by about twelve joints at the tip which are destitute of rays. The palpi are porrected into a short distinct muzzle.

From these characters it will probably be necessary to form this species into a separate subgenus, when the male shall be known. The veins of the wings are arranged as in the typical *Saturniæ*.

Sp. 27. SATURNIA HERILLA, Westw. *S. alis apice undulatis, anticis angulatis brunneo-fulvis valde irroratis, medio fulvescenti fascia obliqua fusca abbreviata; posticis macula magna sulphurea, limbo lato fusco, fulvo irrorato.*

Expans. alar. antic. unc. $4\frac{3}{4}$.

Hab. Sierra Leone (D. Morgan). In Mus. Brit.

Wings fulvous-brown, much varied with darker and lighter shades, and with numerous small dark dots and streaks; the base with a grey shade much-mottled with small dark brown patches; before the middle of the wing is an ill-defined, pale, nearly square patch, resting on the median vein, but extending narrowly along the costal margin, which is much marked with dark dots; the middle of the wing is more uniformly fulvous brown, with a dark, very oblique dash arising from the costa, which is considerably curved beyond the middle: a dark brown oval patch also rests on the middle of the last branch of the median vein; the apical margin of the wing is scalloped and dark

brown, preceded by a paler patch marked with undulating fulvous-brown lines; the hind-angle of the wing being much dotted with different shades of fulvous and brown. The hind-wings have a large sulphur-white patch occupying the base of the wings, except the extreme base, which is pink. The remainder is brown, varied with minute fulvous spots, the anal angle being more mottled.

On the underside the wings are paler and richer coloured, more decidedly mottled; the fore-wings having the base suffused with pink. The veins are fulvous.

The antennæ are but slightly pectinated.

The body is fulvous-brown, the thoracic portion tinged with pink.

Sp. 28. SATURNIA AGATHYLLA, Westw. *S. alis anticis subfalcatis posticis denticulatis; supra pallide rufo-fulvis (in specimine nostro unico valde detritis), in medio ut videtur exocellatis.*

Expans. alar. antic. unc. $3\frac{5}{8}$.

Hab. Congo. In Mus. Brit.

A single specimen only of this insect exists in the British Museum, having the wings so completely denuded of scales, except at the base, that it is impossible to give a detailed character; their outline is however entire. The anterior ones are subfalcate, and the hind ones are denticulated along the outer margin, the tooth at the extremity of the middle branch of the median vein being the most acute. All that remains of the colouring of the fore-wings is a reddish-fulvous buff, which seems indeed to have extended all over these wings, as well as over the hind-wings, which are suffused with pink on the upper side towards the anterior margin. On the under side the wings are coloured as above; the fore-wings are also suffused with pink along the posterior margin at the base, and they, as well as the hind-wings, have the anterior margin somewhat streaked transversely with brown. I can discern no trace of eyes in the middle of the wings. The body both above and below is fulvous brown, as are also the antennæ and legs.

The basal joint of the antennæ is clothed beneath with a thick mass of hairs; each is furnished with eighty rays, each of the twenty joints succeeding the basal one emitting four rays, one close at the base and one close at the apex on each side, the inside of the two on each side being furnished with fine hairs, the tips of which come in contact with each other. The thirteen terminal joints are destitute of rays. The palpi are quite distinct, but scarcely extend beyond the hairs of the face.

Section E.

Sp. 29. SATURNIA (HENUCHA) GRIMMIA, Hübner. *S. alis anticis nigris albo irroratis lunulisque magnis albis, ocello medio fulvo maculam mediam virgatam includente; posticis basi puniceis medio albis maculis duabus nigris, majori ocellum fulvum (cum lunula alba) includente, limbo nigro albo irrorato, maculis marginalibus albidis.*

Expans. alar. antic. circ. unc. 3.

Hab. Africa meridionali.

Syn. *Phalæna (Henucha) Grimmia*, Hübner, Exot. Schm. F. 3, 4.

Sp. 30. SATURNIA (HENUCHA?) DELEGORGUEI, Bdv. *S. alis anticis (maris) valde falcatis; posticis subtriangularibus; omnibus (fæminæ) subrotundatis et parum sinuatis; anticis brunneis basi costa et limbo apicali cinerascensibus, pone medium macula parva vitrea angulata; posticis basi et antice roseis, limbo fusco, striga alba; medio nigro, ocello fulvo, lunula vitreo annuloque nigro.*

Expans. alar. antic. unc. $2-2\frac{1}{4}$.

Hab. in Terra Amazoolu, et apud Portum Natalensem. In Mus. Britann.

Syn. *Saturnia Delegorguei*, Boisduval in Delegorgue's Voyage dans l'Afrique Austr. ii. p. 601.

The antennæ of the male are 32-jointed, each of the fourteen basal joints emitting four rays, the second ray in one joint and the first of the following joint being close together, and only gaping at the tip: one-third of the antennæ at the tip is simple; the rays are set on at right angles, lying flat. The antennæ of the female are very shortly pectinated on each side, except about one-fourth of the length at the tip. The veins of the wings differ from those of the typical *Saturniæ* in having the outer branch of the post-costal vein arising from the middle of the transverse veinlet which closes the discoidal cell, and the two small vitreous spots, forming the angulated spot above described, rest on the outside of the veinlet, being divided from each other by the outer branch of the post-costal vein.

Sp. 31. SATURNIA (HENUCHA?) SMILAX, Westw. *S. alis anticis maris valde falcatis obscure fulvis (♂) seu griseo-fuscis (♀), fascia lata obliqua livida seu castanea utrinque linea tenui pallida marginata, anticis plaga magna subtriloba vitrea; posticis lunula parva media vitrea.*

Expans. alar. unc. $2\frac{1}{2}-2\frac{3}{4}$.

Hab. Port Natal. In Mus. Britann. et Saunders.

The fore-wings of the male are rather narrow and very much hooked at the tip, and angulated beyond the middle of the costa, fulvous brown, palest along the fore-margin, with a rather broad, very oblique fascia a little beyond the middle of the wing, of a rich chestnut colour, shaded to purplish towards the costa; nearly straight along the fore-edge, but much-arched on the outer margin, both edges being marked with a pale, slender, buff line: beyond the middle of the fore-wing is a large, irregular, somewhat trilobed vitreous spot, outwardly edged with a dark line, and succeeded by a pale buff one. The apical portion of the wing beyond the fascia is fulvous buff, shaded to brown in the middle, and to purple. There is also a small dark dot in the middle of the costa.

The hind-wings are fulvous, the middle with a darker oblique fascia tinged with purple, with a pale line on each side; the outer margin curved, and in the middle of this fascia is a small lunate vitreous spot.

The female has the fore-wings slightly waved along the outer margin: the general colour of the wings is darker and more ashy than in the male, the fulvous colour replaced by ashy brown.

The head and a large patch on the thorax are dark fulvous brown in the male, chestnut in the female.

The antennæ of the males are scarcely pectinated beyond the middle; there are twenty-two rays on each side. The apical half simple, with only numerous short setæ at the extremity of the joints. The antennæ of the female are quite simple and setaceous. The veins of the wings are arranged as in the last species, the ocellus of the fore-wing resting on the outside of the transverse veinlet closing the discoidal cell, and being divided into two parts by the outer branch of the postcostal vein*.

Sp. 32. SATURNIA (UROTA) SINOPE, Westw. *S. alis anticis integris, posticis breviter caudatis; anticis fulvo brunneis fasciis duabus albis singula strigam fuscam includente, punctoque parvo ovali media alba, posticis livide puniceis puncto medio albo fasciæque pone medium alba.*

Expans. alar. antic. unc. 3.

Hab. apud Portum Natalensem. In Mus. Britann.

The wings of the male are entire and nearly straight; along the apical margin they are buff-brown or pale reddish brown, with a transverse white bar before and another beyond the middle, each edged on each side with a thin black line, and bearing a black streak along its middle. In the middle of the wing is a small oval white spot edged with black. Hind-wings livid pink, with a white spot in the middle, followed by a white fascia: apical portion of the wing fulvous brown, produced into a short, broad, somewhat triangular tail, obtuse at the tip.

Beneath similarly marked, but with all the colouring dull. Body, legs and antennæ fulvous brown.

The antennæ are rather short, and consist of forty-eight joints, each joint with one short ray on each side; the rays set on obliquely and directed backwards, the tips of the rays being turned forwards.

There are no traces of palpi to be perceived. The veins of the fore-wings are arranged as in the typical *Saturniæ*.

Sp. 33. SATURNIA (APHELIA) APOLLINARIS, Bdv. *S. alis externe rotundatis albis venis nigricantibus, anticis maculis duabus parvis mediis flavis fusco-cinctis; apice nigricanti striga communi extus dentata cum margine postico parallela, margine fusco-nigricanti maculis flavis ornato; abdomine albo apicibus segmentorum flavidis; serieque dorsali laterali et ventrali punctorum nigrorum, pronoti margine antico flavido.*

Expans. alar. antic. fere unc. 3.

Hab. apud Portum Natalensem. In Mus. Britann.

Syn. *Saturnia Apollinaris*, Boisduval in Delegorgue's Voyage dans l'Afrique Austral. ii. p. 601.

The texture of this insect, as described by Boisduval, is "mince et délicate"; the same author states that it is "tout autant une Liparide

* Mr. Angas has represented this species in his plate of Amazoou Lepidoptera, figure 12.

qu'une Saturnide." The veins of the fore-wings are however arranged as in the typical *Saturniæ*; but the antennæ are different, consisting of about thirty-six joints, bipectinated in both sexes with only thirty-four rays on each side, each joint except one or two at the apex emitting only a pair of rays, which are rather short. The palpi are distinct and turned upwards, extending rather further than the hairs of the face: the spiral tongue is distinct.

Boisduval states that this species "vole en plein jour. Une année, aux environs de Port Natal, on aurait pu en prendre par centaines en quelques heures. Deux ou trois jours après il n'existait plus. La femelle que nous est inconnue ne vole pas, peut-être même est-elle aptère, et tous les mâles voltigeaient sans doute à sa recherche." The female is however winged and scarcely distinguishable from the male, as I have ascertained by extracting eggs from the abdomen of a specimen in the British Museum collection, which M. Boisduval would doubtless have taken for a male.

The structure of the antennæ and presence of a spiral tongue, together with the fragile texture of the insect, will require a subgenus for its reception.

May 22.—Harpur Gamble, Esq., M.D., in the Chair.

The following papers were read:—

1. DESCRIPTION OF SOME CORALS, INCLUDING A NEW BRITISH CORAL DISCOVERED BY W. MACANDREW, ESQ.
BY J. E. GRAY, ESQ., F.R.S. ETC.

As yet only a single living species of recent stony coral has been recorded as inhabiting our coast. I am aware that M. Milne-Edwards and M. Haime have described the Torbay coral as belonging to two species and to different genera, viz. *Desmophyllum Stokesii*, Ann. Sci. Nat. ix. 255. t. 7. f. 12, 12 a, and *Cyathina Smithii*, l. c. ix. 288; but from the varieties in form, and especially in the contraction of the base, which I have seen in specimens on the same stone, I believe the genera and species have been established on very unessential characters.

I may state, that from the observations I have been able to make, I believe that the recent corals are very much more influenced by external circumstances, by the rarity or the abundance of food that the animals are able to procure, and by the roughness or quietness of the water they happen to inhabit, and the stations they may accidentally occupy, than the describers of corals even the most recent are willing to allow. This greatly added to the difficulty of distinguishing the species; and if this is the case with the recent corals which we receive in a good state, how much more difficult must it be to distinguish those only found in a fossil, and often in a worn and imperfect condition!

The British coral here noticed is perfectly distinct from the former, and from any European coral that has come under my examination; and when I showed it to M. Milne-Edwards and M. Haime on their

late visit to this country, they stated that it was quite unknown to them, and most nearly allied to an Australasian species. It belongs to the genus *Flabellum*, established by the late M. Lesson in his 'Illustrations of Zoology' in 1831 for a coral from the Japanese Seas. And more lately (in 1841) Dr. A. Philippi established a genus under the name of *Phyllodes* for some fossil allies. Dana, in his work on Zoophytes in 1846, has applied the name of *Euphyllia* to this genus. Quoy and Gaimard referred one of the species to the genus *Turbinolia*.

The only specimen of the coral found by Mr. MacAndrew is unfortunately in an imperfect state, having been broken by the dredge, and I have some doubts if it absolutely belongs to the genus *Flabellum*, as it appears rather to form a more or less circular expanded disk, than a compressed wedge-shaped body. But Messrs. Milne-Edwards and Haime appeared to have no doubt of its belonging to that genus when it was shown to them, and I have therefore adopted their opinion until more perfect specimens are found to verify or correct our knowledge. It may be described as follows:—

FLABELLUM MACANDREWII.

Coral expanded, subcircular?; outline irregular, torn, with acute marginal processes; outer surface smooth, polished, as if varnished; septa thin, far apart, very finely crenulated on the edge in three series; the primary plates large, the secondary nearly as large, but much more narrow near the centre; the tertiary plates small, very narrow.

Hab. North Sea.

The single imperfect specimen here described was found about twenty-five miles from East Shetland, in ninety fathoms water.

Mr. MacAndrew has kindly presented the specimen to the British Museum collection.

M. Milne-Edwards and M. Haime, in their monograph of the genus *Flabellum*, published in the 'Annales des Sciences Naturelles,' ix. p. 256 (in 1848), describe forty-three species, and divide them into three sections, thus:—

a. Coral becoming free by the progress of age.

* Coral becoming free by the cessation of the adherence of the pedicel—*Flabellines pédicellés*.

** Coral becoming free by the rupture of its base—*F. tronquées*.

b. Coral always fixed by its enlarged base—*F. fixées*.

The last section is very distinct from the two former, and might almost form a separate genus, for which I should be inclined to retain Dana's name of *Euphyllia*.

The other two sections are separated from one another by very slight characters, which I believe are not even sufficient to separate the specimens of the same species, for some specimens from the same localities retain their narrow base, while in others this part is more or less truncated.

Indeed from the numerous specimens of this genus which I have

been enabled to examine in the Japanese boxes which are sent to the Canton market, and from thence to London, and others brought from Northern China by Mr. Fortune, I have little doubt that the species is very variable. I had come to this conclusion, and arranged all the specimens together in one tray in the British Museum, before Messrs. Milne-Edwards and Haime came to examine the corals in the Museum for description in their papers in the 'Annales des Sciences Naturelles' for 1848; and the examination of the characters given by these naturalists for their several species has not induced me to change my opinion, which has, on the contrary, been strengthened by a second comparison.

I may state that we have in the British Museum two very distinct recent species:—1. *Flabellum affine*, Edwards and Haime, n. 31. t. 8. f. 10, from Australia, which has very close plates. 2. *Flabellum Pavoninum*, n. 1, from Japan and North China. And Milne-Edwards and M. Haime have described another from the Falkland Islands, brought to France by M. Dupetit Thouars, and hence called *Flabellum Thouarsii*, n. 10. t. 8. f. 5, which appears to be distinct from the two former.

From the examination of the numerous specimens of *Flabellum Pavoninum* which I have been enabled to compare and collect, I am inclined to believe that all the specimens which are brought from the Japanese Seas belong to a single species, which I believe will include as varieties the following species described by M. Milne-Edwards and M. Haime, viz.:—

1. *Flabellum distinctum*, n. 2. The specimen in the British Museum, from which this species is described, came from Japan, and not the Red Sea, as stated in the work cited.
2. *F. debile*, n. 23. t. 8. f. 2.
3. *F. Sumatrense*, n. 24.
4. *F. spinosum*, n. 25. t. 8. f. 4.
5. *F. aculeatum*, n. 26. t. 8. f. 3.
6. *F. compressum*, n. 20 = *Fungia compressa*, Lamk.
7. *F. Bairdii*, n. 32. From Japan.
8. *F. Cumingii*, n. 33. t. 8. f. 11.
9. *F. elongatum*, n. 34. t. 8. f. 7.
10. *F. profundum*, n. 35. China (Fortune). *F. spheniscus*, n. 42?
11. *F. crassum*, n. 36. t. 8. f. 8.
12. *F. crenulatum*, n. 37.
13. *F. elegans*, n. 38. From Japan; B. M.
14. *F. Candeanum*, n. 39. t. 8. f. 13.
15. *F. Stokesii*, n. 40. t. 8. f. 12.
16. *F. Owenii*, n. 41. t. 8. f. 9.

I thought at first that these specimens might be separated into two, according to the colour, some being red, with the sides of the coral keeled, and others white, with the sides more or less rounded; *Flabellum Pavoninum*, Lesson, being the type of one species, and *Fungia compressa*, of Lamarck, of the other. But there are specimens red on one side and white on the other, and some on the other hand keeled on one edge and rounded on the other; some with elongated spines

on one edge, and spiniferous or only with a slight tubercle on the opposite one; sometimes one edge has two spines and the other only one, or a tubercle, and the extent of the truncation of the base differs in every example.

The same examination has also induced me to believe that the specimen which these authors have described under the name of *Placotrochus lævis*, p. 283. t. 8. f. 15, is only a variety of the same species; and that *Acanthocyathus Grayii*, 293. t. 9. f. 2, is only a specimen of the same species which has lost its compressed form. I have not seen *Rhizotrochus typus*, p. 282. t. 8. f. 16, or *Blastotrochus nutrix*, p. 284. t. 8. f. 14; but from the figures, I have great suspicions that they are only modifications of the same species.

To give some idea of the variations produced by local causes in corals, I may state that the specimens which Messrs. Milne-Edwards and Haime have described under the generic name of *Heterocyathus*, are only specimens of the genus *Cyathus* which have been changed in form from their having grown attached to a spiral shell which was inhabited by parasitic crustacea. I have specimens showing all the grades of change, from the nearly normal conical form of the genus to the truncated form which has been described as the type of the genus *Heterocyathus*. This form was well-described by Spengler in 'Nova Acta Hafniæ,' i. 240, and noticed by Gmelin under the name of *Madrepora Cochlea*, p. 3763.

Messrs. Milne-Edwards and Haime described two species of this genus under the names of *H. æquicostatus*, t. 10. f. 8, and *H. Roussæanus*, t. 10. f. 9. Of the former he appears only to have seen a single specimen. We have in the British Museum three very distinct species, which may be thus described:—

1. *H. COCHLEA* = *Mad. Cochlea*, Gmelin, S. N. *H. æquicostatus*, Milne-Edwards and Haime, 324. t. 10. f. 8.

Coral subcylindric, hard, white, with narrow, equidistant, distinct grooves, crenulated on the edges; base rather dilated; laminæ narrow, sharp-edged, very unequal, grooved on each side, and with crowded columns in the centre of the star.

Hab. Chinese Seas.

The holes on the outer surface are large and distinct.

2. *H. HEMISPHERICA*.

Coral subcircular, depressed, subhemispherical, nearly flat below, regularly convex above; sides rounded; plates of star broad-topped, as if truncated, covered on top and sides with very numerous crowded spines and tubercles; centre of star roundish, with small columella.

Hab. Chinese Seas.

The plates of this species resemble those figured as belonging to *H. Roussæanus*, l. c. 325. t. 10. f. 9; but the shape of all the two specimens in the Museum, which are nearly similar, is quite distinct from the view of the side of that species.

3. *H. EUPSAMMIDES*.

Coral polymorphous, base flat, sides shelving, sinuous, surface covered with very close, irregular, sinuous, denticulated ridges, and

pierced with numerous minute pores; star irregular, compressed or sinuous; laminæ narrow, then cribellated on the surface, and with an oblong, elongated, convex, cribellated centre.

Var. star more or less contracted in the centre, forming two more or less distinct roundish stars.

Hab. Chinese Seas.

This species is immediately known from the former by the peculiarity of the surface, which is like that of *Caryophyllea ramea*, and by the convex elongated form of the centre of the star.

I have described these three species together on account of their having the same form and habit, but the structure of the surface and the great difference in the form and conformation of the stars induce me to believe that they probably belong to three very distinct families of corals.

Since I described these corals I have shown the two latter species to M. Milne-Edwards, who states that they had not before come under his observation.

LINNEAN SOCIETY.

May 24, 1849.—The Lord Bishop of Norwich, President, in the Chair.

This day, the anniversary of the birth of Linnæus, and that appointed by the Charter for the Election of Council and Officers, the President opened the business of the day, and the Secretary read the following notices of those Members of the Society with whose decease he had become acquainted during the year.

Sir John Barrow, Bart.

George Bennett, Esq.

Edwin Charles Charlton, Esq.

Edward Forster, Esq., the late lamented Treasurer of the Society, was the third son of Edward Forster, Esq., for fifty-two years Governor of the Russia Company of London, and was born at Walthamstow in the county of Essex on the 12th of October 1765. He passed the greater part of his childhood in the neighbourhood of Epping Forest, and from the age of fifteen became particularly attached to the study of English botany, which he ardently cultivated through a long and active life. He was a partner in the eminent banking-house of Lubbock, Forster and Company, and to within a few hours of his death took a leading part in the business of the bank. In 1800 he was elected a Fellow of the Linnean Society, of which he became Treasurer in 1816, and one of the Vice-Presidents in 1828; and his kindliness of disposition, unremitting attention to his duties, and zeal for the interests of the Society, will long endear his memory to all its members. He was a man of very active habits; rising daily at 6 o'clock, usually spending an hour before breakfast in his garden, in which he cultivated many of the rarer and more obscure British species, and taking a great deal of bodily exercise, which, together with his extreme temperance, probably contributed greatly to the prolongation of his life. His death, which took place in the 84th year of his age, at his residence,